

XIV. *Report on the Hydroids collected during the Expeditions of H.M.S. 'Porcupine.'*
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Read 18th February, 1873.

[PLATES LXV. to LXVIII.]

THE Hydroids obtained during the two expeditions of the 'Porcupine' (1869 and 1870), and placed in my hands for determination, consist of trophosomes, in some cases destitute of gonosome, but in others provided with this important element of the colony. No free planoblasts are contained in the collections of either expedition.

The dredgings of 1869 are, on the whole, from greater depths, and contain a greater number of new species than those of 1870; for though a few of the specimens of the expedition of 1869 are from inconsiderable depths (64, 75, and 90 fathoms), the majority are from very deep water, having been dredged from depths varying from upwards of 100 to between 600 and 700 fathoms. The deepest dredgings of 1870 were from 539 fathoms.

One result of the expeditions has been the determination of the very extensive range of depth enjoyed by some well-known species. Thus *Sertularella polyzonias*, though very generally distributed in the zone between tide-marks, was brought up by the 'Porcupine' explorers from a depth of 374 fathoms. *Hydrallmania falcata*, though a common species on the European shores of the Atlantic in the coralline zone of Forbes, which corresponds to a depth of between 15 and 50 fathoms, was obtained by the 'Porcupine' explorers from a depth of 542 fathoms; while *Thuiaria articulata* was brought up from 632 fathoms, though frequenting a depth of less than 50 fathoms round our shores.

Many species which have not yet been obtained elsewhere were brought up from great depths. Among these is a *Diphasia* from a depth of 632 fathoms; while a Plumularidan which must be referred to a new genus (*Cladocarpus*) was brought up by the same haul of the dredge. Two new species of *Thuiaria* were dredged from a depth of 640 fathoms, and a *Lafoëa* from 345 fathoms. A *Sertularella* nearly allied to *S. Gayi*, of which it may, perhaps, be regarded as only a variety, ranged from 290 to 605 fathoms. It is a fact by no means without significance, that, in every case hitherto observed, these deep-water Hydroids belong to forms which produce fixed sporosacs instead of planoblasts.

In the records of the expedition of 1869, it is stated that fragments of a Hydroid were
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brought up from the enormous depth of 2435 fathoms. These evidences of abyssal hydroid life have never come into my hands: they appear to have been lost; so that a nearer determination of them is now impossible¹.

The cold area lying between Shetland and the Faroe Isles, where the bottom is overflowed by a deep icy current from the Polar Seas, and whose discovery by the 'Porcupine' explorers constitutes one of the most important additions to our knowledge of the physical geography of the North Atlantic, is not without a deep-sea Hydroid fauna, although its bottom varies from the freezing-point of fresh water to nearly two and a half degrees of Fahrenheit below it. The two new species of *Thuiaria* already alluded to were obtained from it where the temperature of the bottom was as low as 30° Fahr.; while, from the same area, the new Plumularian genus (*Cladocarpus*), with the new species of *Diphasia* and *Laföëa*, also referred to above, were obtained from water whose temperature varied in different places from 30°·5 Fahr. to 29°·8 Fahr.

It will thus be apparent that, so far as the natural history of the HYDROIDA alone is concerned, the results of the expedition are important, bringing, as they do, to our knowledge many species hitherto unknown, and throwing new light on the relations between this most interesting group of organisms and the physical conditions which surround them.

The following species, already known and described in systematic works, were obtained during the expedition of 1869:—

Name.	N. lat.	W. long.	Depth.	Temperature at bottom.
	° ' .	° ' .	fathoms.	° Fahr.
<i>Eudendrium ramosum</i>	59 34	7 18	542	43·8
<i>Laföëa fruticosa</i>	{ 60 23	0 33 E.	75	44·0
	{ 60 32	0 29	64	49·1
<i>Laföëa dumosa</i>	{ 60 23	0 33 E.	75	44·0
	{ 60 32	0 29	64	49·1
<i>Filellum serpens</i>	{ 60 23	0 33 E.	75	44·0
	{ 60 32	0 29	64	49·1
<i>Diphasia pinaster</i>	{ 52 25	11 40	90	50·0
	{ 60 23	0 33 E.	75	44·0
	{ 60 32	0 29	64	49·1
<i>Sertularella polyzonias</i>	59 23	7 4	374	46·0
<i>Sertularella Gayi</i>	59 23	7 4	374	46·0
<i>Sertularia abietina</i>	{ 60 23	0 33 E.	75	44·0
	{ 60 32	0 29	64	49·1
<i>Thuiaria articulata</i>	60 14	6 17	632	30·5
<i>Grammaria abietina</i>	62 1	5 19	114	45·0
<i>Hydrallmania falcata</i>	59 34	7 18	542	43·0

¹ See Preliminary Report, Proc. Roy. Soc. vol. xviii. 1869, p. 429.

The following hitherto undescribed forms were obtained during the same expedition:—

Name.	N. lat.	W. long.	Depth.	Temperature at bottom.
	° '.	° '.	fathoms	° Fahr.
<i>Thuiaria hippuris</i>	61 21	3 44	640	30·0
<i>Thuiaria laxa</i>	{ 60 21	3 44	640	30·0
	{ 60 25	8 10	384	30·6
<i>Thuiaria salicornia</i>	62 1	5 19	114	45·0
<i>Sertularella Gayii</i> , var. <i>robusta</i>	{ 59 56	6 27	363	31·4
	{ 60 4	6 19	605	29·8
	{ 61 10	2 21	345	30·0
	{ 60 39	3 9	203	47·6
	{ 60 14	4 30	290	41·5
<i>Diphasia coronifera</i>	60 14	6 17	632	30·5
<i>Halicornaria ramulifera</i>	61 21	3 44	640	30·0
	{ 60 14	6 17	632	30·5
<i>Cladocarpus formosus</i>	{ 60 34	4 40	560	29·8
	{ 61 3	5 58	167	44·3
<i>Lafoëa halecioides</i>	{ 61 10	2 21	345	30·0
	{ 61 21	3 44	640	30·0

During the expedition of 1870 the following known species were obtained:—

Name.	N. lat.	W. long.	Depth.	Temperature at bottom.
	° '.	° '.	fathoms.	° Fahr.
<i>Calyceella fastigiata</i>	42 44	9 23	81	53·5
<i>Cuspidella grandis</i>	42 44	9 23	81	53·5
<i>Lafoëa dumosa</i>	42 44	9 23	81	53·5
<i>Diphasia pinaster</i>	{ 36 44	8 8	364	52·7
	{ 42 44	9 23	81	52·5
<i>Sertularella polyzonias</i>	38 15	9 0	64	
<i>Sertularella Gayi</i>	42 44	9 23	81	53·5
<i>Antennularia antennina</i>	42 44	9 23	81	53·5
<i>Aglaophenia myriophyllum</i>	{ 36 44	8 8	364	52·7
	{ 42 44	9 23	81	53·5

The following are the hitherto undescribed species which were obtained during the same expedition:—

Name.	N. lat.	W. long.	Depth.	Temperature at bottom.
	° '.	° '.	fathoms.	° Fahr.
<i>Aglaophenia dromaius</i>	{ 48 6	9 18	539	48·0
	{ 48 13	9 11	257	50·0
<i>Aglaophenia elongata</i>	{ 48 6	9 18	539	48·0
	{ 48 13	9 11	257	50·0
<i>Diplipteron insigne</i>	36 44	8 8	364	52·7

It will be noticed that, with one exception (that of *Eudendrium ramosum*), all the species enumerated belong to calyptoblastic genera. Besides *Eudendrium ramosum*, a

few other gymnoblastic species were collected. These belong apparently to the genera *Eudendrium* and *Perigonimus*; but the state of preservation of the specimens is not such as to render it possible to determine them more closely.

DESCRIPTIONS OF NEW SPECIES.

LAFOËIDÆ.

LAFOËA HALECIOIDES. Plate LXVI. figs. 1, 1^a.

Trophosome.—Stem attaining a height of about two inches, pinnately branched, rigid, branches alternate, main stem and primary branches fascicled; ultimate ramuli jointed at irregular intervals, not fascicled. Hydrothecæ shortly pedunculate and disposed with a regularly pinnate and alternate arrangement along the length of the ultimate ramuli, and along that of the principal branches, one almost always situated in the axil of each ultimate ramulus; deeply cyathiform, with the axis slightly curved, and with the margin even, and slightly everted, usually marked for some distance below the margin by faint circular striæ.

Gonosome not known.

The present species has a very rigid habit, and possesses much of the aspect of certain Haleciums. It approaches *Lafoëa fruticosa* by its large size and shrubby growth, but differs from it by its pinnate ramification and *Halecium*-like habit. As in every other species of *Lafoëa* hitherto described, no gonosome was present.

It was dredged from the cold area at depths of 640 and 345 fathoms, the temperature in both cases having been ascertained to stand at 30° Fahr.

THUIARIDÆ.

THUIARIA LAXA. Plate LXV. figs. 1, 1^a.

Trophosome.—Stem attaining a height of about nine inches, and furnished with fan-shaped groups of dichotomous branches for some distance from the distal extremity, while it is destitute of branches for the greater part of its course; groups of branches about an inch in length, flexile, arched, with the convexity of the curve looking upwards, arranged spirally, rather distant, each branchlet of every bifurcation having a joint at its base, and having for the most part one or more joints at irregular distances along its length; stem gently zig-zag, annulated at the base, and with groups of two or three annuli at intervals for some distance upwards, giving the appearance of joints. Hydrothecæ scattered upon the main stem, but on the branches alternate, each separated from those above and below it by a space equalling about one fourth of its own height; orifice transversely elliptical, provided with a valve-like operculum.

Gonosome.—Gonangia piriform, springing from the upper side of the branches, each in an interval between two neighbouring hydrothecæ of a series.

This species has a peculiar habit, caused by its long, rather distantly disposed, flexile branches, which give it a loose diffuse character, by which it contrasts with the closer and more compact habit of other species.

It was obtained from the cold area lying between Shetland and the Faroe Isles, in two dredgings—one at 640 fathoms, where the bottom had a temperature of 30° Fahr., and the other at 363 fathoms, with a bottom-temperature of 30°·6 Fahr.

THUIARIA HIPPURIS. Plate LXV. figs. 2, 2^a.

Trophosome.—Stem attaining a height of about six inches, slightly zig-zag, except towards its base; its proximal end for about one sixth of its entire length destitute of branches, annulated irregularly at the base, and with joint-like annuli at irregular intervals for some distance upwards; branches repeatedly dividing dichotomously so as to form fan-shaped groups. Hydrothecæ on the main stem scattered, on the branches alternate; those in each series separated from one another by a distance of little more than two thirds of their height; orifice semicircular, provided with a valve-like operculum.

Gonosome not known.

Thuiaria hippuris has somewhat the aspect of *T. thuia*, from which, however, it differs by its less crowded ramuli and more distant hydrothecæ, as well as by its more attenuated and flexile stem.

It was dredged in the deep cold area between Shetland and the Faroe Isles, along with *Thuiaria laxa*, from a depth of 640 fathoms, where the temperature of the bottom was as low as 30° Fahr.

THUIARIA SALICORNIA. Plate LXV. figs. 3, 3^a.

Trophosome.—Stem attaining a height of about two inches, jointed at rather irregular intervals, simple or sparingly branched, somewhat rigid, with pinnately disposed branchlets above, destitute of branchlets below; pinnæ alternate, about four lines in length, articulated to projections of the stem. Hydrothecæ flask-shaped, alternate, immersed for the greater part of their depth, but becoming free at a short distance from the orifice, simply distichous on the main stem, and with the axes of all the hydrothecæ in each row turned in the same direction, but on the pinnæ having their axes alternately directed to the right and left, so as to give them here an apparently tetrastichous arrangement.

Gonosome not known.

The alternating directions of the axes of the hydrothecæ composing each row of the pinnæ confer on this species a striking physiognomy. *T. salicornia* further differs from other species of *Thuiaria* in the less complete immersion of the hydrothecæ, and from most species in its simple pinnately disposed ramuli. It was obtained west of the Faroe Isles, in lat. 62°, long. 5° 30', at a depth of 114 fathoms.

SERTULARIDÆ.

DIPHASIA CORONIFERA. Plate LXVI. figs. 2, 2^a.

Trophosome.—Stem attaining a height of about three inches, simple (in specimen), stout, rigid, not fascicled, tapering towards the summit, pinnate; pinnæ alternate. Hydrothecæ tubular, with the margin entire, free for about the upper third, which diverges without any abrupt bending from the axis, each pair of hydrothecæ on the pinnæ separated from its neighbouring pairs by an interval of about half the length of the hydrotheca, but by about double that interval on the main stem.

Gonosome.—Gonangia (male) springing from the pinnæ, each at a point just below a hydrotheca, contracted below into a short curved peduncle, rapidly expanding upwards, and terminating in a broad circular summit, whose circumference is raised into eight similar, strong, broad spines, and from whose centre projects a short papilliform process carrying the orifice on its extremity. Female gonangia not known.

This species was dredged in lat. 64° 15', long. 6° 15', from a depth of 632 fathoms.

SERTULARELLA GAYI, var. ROBUSTA. Plate LXVI. figs. 3, 3^a.

The form here recorded as a variety of *Sertularella Gayi* is a Hydroid with a strongly fascicled, thick, rigid stem, which attains a height of about six inches, and sends off on all sides simple, non-fascicled, obliquely jointed ramuli, and occasionally a fascicled branch, from which non-fascicled ramuli then proceed, as in the main stem. The hydrothecæ are borne one on each internode of the ramuli, immediately below a joint; they arch outwards from the ramulus, are turgid below, marked upon the upper side by transverse rugæ, smooth below, and have an obscurely four-toothed aperture.

The gonangia (female ?) are ovate, on short peduncles, strongly annulated towards the summit, but smooth below; the summit is in the form of a saucer-shaped expansion, from the centre of which rises a conical process, carrying on its top an obscurely two-lobed orifice.

If it were not for the occurrence of intermediate forms, I should have regarded the present Hydroid as specifically distinct from *Sertularella Gayi*. It differs from typical specimens of *S. Gayi* by the irregular disposition of its ramuli (which in the latter species are pinnate), and by the tubular summit of the gonangia. From *S. polyzonias*, with which *S. Gayi* is closely allied, it differs by its much more robust habit and thick fascicled stems. In specimens obtained from some other dredgings of the 'Porcupine,' the ramification is rather more pinnate. It seems, indeed, to form a connecting link between *S. polyzonias* and *S. Gayi*, and would thus go far to justify us in regarding all three as merely varieties of a single species.

The form here described would seem to be rather widely distributed over the area explored. It was obtained from the cold region, at depths of 345, 363, and 605 fathoms, with a bottom-temperature which varied from 31°·4 Fahr. to 29°·8 Fahr., while it was

also brought up in dredgings made outside of this region in depths of 203 and 290 fathoms, with temperatures of 47°·6 Fahr. and 41°·5 Fahr.

PLUMULARIDÆ.

Among the eight genera to which the new hydroid species of the expeditions may be referred, no less than four belong to the family of the Plumularidæ—a family in which the dredgings were especially rich, both in new species and in species which had been already described. Among the species now for the first time made known, are several highly interesting forms, which not only render necessary the construction of some new generic groups, but suggest the modification of some old ones.

I propose to distribute the new Plumularidæ of the 'Porcupine' expeditions under the following four genera—*Aglaophenia*, *Ialicornaria*, *Cladocarpus*, and *Diplopteron*.

AGLAOPHENIA.

The genus *Aglaophenia* is here understood in a somewhat restricted sense, and must be regarded as limited by the following diagnosis:—

Trophosome.—Hydrocaulus with pinnate ramification. Hydrothecæ usually with an intrathecal ridge. Nematophores fixed; lateral nematophores one on each side of the orifice of the hydrotheca; mesial nematophores adnate for a greater or less extent to the front of the hydrotheca.

Gonosome.—Gonangia included in corbulæ, each of which replaces an ordinary pinna.

The presence of an intrathecal ridge, referred to in the above diagnosis, affords a character hitherto overlooked in the descriptive zoology of the Plumularidæ. I have given this designation to a more or less obliquely transverse ridge, which occurs in the interior of the hydrothecæ of a large number of Plumularidæ, where it forms an imperfect septum, by which the hydrotheca becomes divided into a proximal and a distal portion. The form of this ridge varies, and will afford characters available in specific diagnosis.

AGLAOPHENIA DROMAIUS. Plate LXVII. figs. 1, 1^a, 1^b, 1^c.

Trophosome.—Stem attaining a height of between five and six inches, simple, flexile, slender, not fasciated, divided into internodes of equal length; pinnæ springing each from a point near the middle of an internode, alternate, rather distant, of nearly equal length, extending along the stem to within a short distance of its base. Hydrothecæ deeply concave in front just above the line of attachment of the mesial nematophore; margin deeply toothed; intrathecal ridge strong, commencing at the front of the hydrotheca just below the orifice by which the cavity of the mesial nematophore communicates with that of the hydrotheca, and thence extending backwards but not meeting the mesial line of the back; mesial nematophore adnate for about two thirds of its length to the front of the hydrotheca; lateral nematophores of moderate size, slightly overtopping the hydrotheca.

Gonosome.—Corbula closed, rather elongated, with seven or eight moderately developed serrated ribs; no free spur-like appendage at its base.

Aglaophenia dromaius is a lax flexile species, strongly suggesting, both in size and form, one of the slender loose-barbed plumes of an Emu's feather. It comes very near to *Aglaophenia tubulifera*, Hincks, from which, however, it differs by its smaller lateral nematophores, and by its more elongated corbulæ as well as by the slighter development of their serrated crests, and by the absence of the spur-like appendage at their base. It was dredged off the Spanish coast from a depth of 539 fathoms.

AGLAOPHENIA ELONGATA. Plate LXVII. figs. 2, 2^a, 2^b.

Trophosome.—Stem attaining a height of about six inches, irregularly or subalternately branched, not fasciated, divided into equal internodes; pinnæ slender, alternate, each attached to a point a little below the distal end of an internode. Hydrothecæ deep and narrow, nearly cylindrical, margin cut into distinct and equal teeth; intrathecal ridge extending but a short distance from the posterior walls of the hydrotheca near the fundus of its cavity; mesial nematophore adnate for nearly its entire length, and attaining about one third the height of the hydrotheca; lateral nematophores scarcely overtopping the hydrotheca.

Gonosome.—Corbulæ closed, short and deep, with about seven moderately developed serrated ribs.

This is a slender, loosely branched, rather straggling form, and is especially distinguished by its deep narrow hydrothecæ. It was dredged along with *Aglaophenia dromaius* on the coast of Spain from a depth of 539 fathoms.

HALICORNARIA, Busk (modified).

Trophosome.—Hydrocaulus with pinnate ramification. Hydrothecæ usually with an intrathecal ridge. Nematophores fixed; lateral nematophores one on each side of the orifice of the hydrotheca: mesial nematophores usually adnate for a greater or less extent to the front of the hydrotheca, rarely free.

Gonosome.—Gonangia not included in corbulæ or protected by gonangial branches.

The generic name *Halicornaria* was proposed by Busk for such Plumularidæ as are deprived of corbulæ, and are otherwise referable to the type of the *Plumularia setacea* of authors. The name of *Halicornaria*, however, is displaced by Lamouroux's prior name of *Aglaophenia*, which, though applied by Lamouroux not only to the forms referable to the type of *Plumularia setacea* but to those also which have *Plumularia pluma* of authors as their type, may be now restricted to the latter, thus allowing the *Plumularia setacea* and its allies to retain undisturbed possession of the name of *Plumularia* assigned to both forms by Lamarck. Rather than introduce a new name, I have deemed

it better to employ the existing name of *Halicornaria* (though in a sense somewhat different from that assigned to it by Busk) for such Plumularidæ as possess the trophosome of *Aglaophenia* but have their gonangia destitute of corbulæ or other protection. Among British species the genus would include the *Plumularia pennatula* of Lamarck.

HALICORNARIA RAMULIFERA. Plate LXVII. figs. 3, 3^a, 3^b, 3^c, 3^d.

Trophosome.—Stem attaining a height of about an inch and a half, slightly recurved, simple, fascicled below, but becoming single towards the summit; pinnæ alternate, borne each upon a short process of the stem and extending along the stem for about three quarters of its entire height, longest towards the centre of the series, where they have a length of about two lines, and thence decreasing in length upwards and downwards, jointed, with each joint supporting a hydrotheca, and with its cavity constricted from distance to distance by imperfect septa. Hydrotheca adnate to the pinna for a little more than half its height, free for the remainder, adnate portion tumid, free portion funnel-shaped, abruptly bent forwards, with its anterior wall forming nearly a right angle with the adnate portion and having the margin deeply serrated; no intrathecal ridge; mesial nematophore detached from the hydrotheca, and forming a stout free tubular spine opening by a slit along that side which faces the hydrotheca; lateral nematophores forming a pair of short tubular diverging spines; a long jointed usually simple ramulus, destitute of hydrothecæ, given off from every joint of the pinnæ between the fundus of the hydrotheca and the mesial nematophore, emitting nematophores from distance to distance and curving over the hydrotheca towards the distal extremity of the pinna; main stem carrying a pair of nematophores at the base of every pinna.

Gonosome.—Gonangia (female?) ovate, with truncate summit, each springing from the front of one of the processes which are emitted by the main stem for the support of the pinnæ.

This is a very distinct and well-marked form. It will be easily recognized by the funnel-shaped and abruptly divergent distal portion of the hydrothecæ, and by the long ramuli, which do not develop hydranths and which are emitted by the pinnæ at the base of each hydrotheca. It is also rendered very remarkable by the way in which the accessory ramulus interposes itself between the hydrotheca and its mesial nematophore. It plainly constitutes a connecting link by which *Aglaophenia* passes into *Plumularia*.

Halicornaria ramulifera was obtained in the deep cold area along with *Thuiaria laxa*, *Thuiaria hippuris*, and *Lafœa halecioides*, from a depth of 640 fathoms, where the thermometer registered 30° Fahr., thus living in a temperature which was 2° Fahr. below the freezing-point of fresh water.

CLADOCARPUS, Allman.

Trophosome.—Hydrocaulus with pinnate ramification. Hydrothecæ with an intra-

thecal ridge. Nematophores fixed; lateral nematophores, one on each side of the orifice of the hydrotheca; mesial nematophores usually adnate for a greater or less extent to the front of the hydrotheca, occasionally free.

Gonosome.—Gonangia not included in corbulæ, but borne on the sides or at the base of special protective branches, which are appendages of the pinnæ.

I have constructed the genus *Cladocarpus* for a group of Plumularidæ in which the proper hydrothecæ-bearing pinnæ carry peculiar branching appendages (Plate LXVIII. fig. 1^a, *a*, *a*), which are destined to support the gonangia or in some other way to afford protection to them.

These appendages differ essentially from the open and closed corbulæ of other forms in the fact that they are not, like corbulæ, metamorphosed pinnæ, which take the place of unaltered pinnæ, but appendages superadded to the pinnæ.

In Kirchenpauer's subgenus *Macrorhynchia*, the gonangia are also borne on special branches (gonocladia and nematocladia, of Kirchenpauer); but these are always, as in the true corbulæ, metamorphosed pinnæ.

Macrorhynchia is further distinguished from *Cladocarpus* by the form of its mesial nematophores, which are very long, usually far surpassing the height of the hydrotheca, and which, as Kirchenpauer first pointed out, are always provided with a lateral as well as a terminal orifice after they cease to be adnate to the hydrotheca.

It will be seen that the genus *Cladocarpus* is nearly allied to *Aglaophenia*. With this genus it is coincident so far as regards its trophosome; but it differs from it in its gonosome, which is not provided with corbulæ, and instead of these receptacles has special ramuli, which are appendages of the pinnæ and are destined for the protection of the gonangia. Its connexion with *Aglaophenia* is maintained through the forms included by Kirchenpauer in his subgenus *Macrorhynchia*.

CLADOCARPUS FORMOSUS. Plate LXVIII. figs. 1, 1^a, 1^b.

Trophosome.—Stem attaining a height of between two and three inches, slightly recurved, simple, or with some small branches given off from its anterior aspect, fascicled below, pinnæ alternate, jointed, each joint supporting a hydrotheca, pinnæ near the centre of the series about three quarters of an inch in length, and thence decreasing in length upwards and downwards. Hydrothecæ nearly cylindrical, with the margin provided with short teeth; mesial nematophore forming a stout spine extending to about half the height of the hydrotheca, to which it is adnate for the greater part of its length, becoming free at a short distance from its summit; lateral nematophores forming short blunt conical processes, slightly rising above the margin of the hydrotheca. Main stem (rachis) giving off minute nematophores, which are disposed in more or less regular verticils.

Gonosome.—Gonangia-bearing ramuli springing each from the basal joint of a pinna,

dichotomously branched, provided with numerous nematophores along their length, and carrying the gonangia singly at the points of bifurcation; a gonangium is also frequently borne by the main stem close to the origin of a pinna. Gonangia (sex indeterminable in the specimens) nearly sessile, obovate.

This very beautiful species was dredged from a depth of 167 fathoms, where the temperature of the bottom stood at 44°·3 Fahr.

DIPLOPTERON. Gen. Char.

Trophosome.—Hydrocaulus plumose, doubly pinnate, nematophores movable, never adnate to the hydrotheca; hydrothecæ destitute of intrathecal ridge; two pairs of lateral nematophores flanking the hydrotheca.

Gonosome.—Gonangia not protected by corbulæ or by special ramuli.

The genus *Diplopteron* is distinguished from *Plumularia* by its doubly pinnate ramification, and by the possession of two pairs of lateral nematophores. The doubly pinnate hydrocaulus of *Diplopteron* confers upon this genus a very striking and instantly recognizable feature, which marks it out from *Plumularia* as distinctly as *Antennularia* is distinguished from the same genus by its verticillate ramification.

We know of no other member of the family in which there is more than a single pair of lateral nematophores.

DIPLOPTERON INSIGNE. Plate LXVIII. figs. 2, 2^a, 2^b, 2^c.

Trophosome.—Stem attaining a height of about 6 inches, giving off an occasional branch, rooted by an entangled mass of tubular filaments, and carrying closely set, regular, opposite, primary pinnæ, which are destitute of hydrothecæ; and carry along their entire length the ultimate or hydrotheca-bearing pinnæ; stem and primary pinnæ fascicled, becoming single only towards the distal extremities; ultimate pinnæ borne not only on the primary pinnæ but on the stem, in the intervals between the primary pinnæ, closely set, alternate, and of nearly equal length, divided by oblique joints into internodes, and giving off each close to its origin a branchlet, which often bifurcates. Hydrothecæ deep, bell-shaped, free for about the distal half of their length, orifice circular, entire, slightly everted, every internode of the ultimate pinnæ carrying a hydrotheca. Two very large bithalamic lateral nematophores borne on each side of the hydrotheca and there articulated to a lateral process of the internode, while a pair of minute lateral nematophores is carried just above them, a mesial nematophore borne by the internode at the proximal side of the hydrotheca and another at its distal side.

Gonosome.—Gonangia oval, with truncated summit, borne on a short two-jointed peduncle, which springs from the ultimate pinna close to its origin.

In the opposite disposition of the primary pinnæ of *Diplopteron insigne* we are reminded of the ramification of *Plumularia catharina*. In this Hydroid, however, the

ramification is, like that of all the true *Plumulariæ*, singly pinnate, while it is exceptional only in the opposite instead of alternate arrangement of the pinnæ or hydrotheca-bearing ramuli.

A rather striking feature of *Diplopteron insigne* consists in the ramulus which each of the ultimate pinnæ gives off near its origin. This ramulus, which usually bifurcates, consists of slender elongated internodes, each bearing a hydrotheca and nematophores quite like those of the pinnæ. The gonangia form two closely set alternating series running along the front of the rachis and along that of the primary pinnæ from the base to the apex.

Diplopteron insigne, when living, must be a singularly beautiful object, while the great development of the nematophores must especially fit it for the observation of the characteristic phenomena of these bodies. Indeed the spirit-specimens examined were to a great extent enveloped and obscured by irregular filaments and masses of a granular mucus-like substance, which I have no doubt are the remains of the pseudopodial extensions from the protoplasmic contents of the nematophores. It was dredged off the south-west coast of Spain, from a depth of 364 fathoms.

DESCRIPTION OF THE PLATES.

PLATE LXV.

- Fig. 1. *Thuiaria laxa*, natural size.
 Fig. 1^a. *Thuiaria laxa*, portion of hydrothecal ramulus magnified.
 Fig. 2. *Thuiaria hippuris*, natural size.
 Fig. 2^a. *Thuiaria hippuris*, portion of hydrothecal ramulus magnified.
 Fig. 3. *Thuiaria salicornia*, natural size.
 Fig. 3^a. *Thuiaria salicornia*, a portion magnified.

PLATE LXVI.

- Fig. 1. *Lafoëa halecioides*, natural size.
 Fig. 1^a. *Lafoëa halecioides*, a portion magnified.
 Fig. 2. *Diphasia coronifera*, natural size.
 Fig. 2^a. *Diphasia coronifera*, a portion magnified.
 Fig. 3. *Sertularella gayi*, var. *robusta*, natural size.
 Fig. 3^a. *Sertularella gayi*, var. *robusta*, a portion magnified.

PLATE LXVII.

- Fig. 1. *Aglaophenia dromaius*, natural size.
 Figs. 1^a, 1^b. *Aglaophenia dromaius*, portions of hydrothecal ramuli magnified.

- Fig. 1^c. *Aglaophenia dromaius*, portion of stem, with corbula, magnified.
 Fig. 2. *Aglaophenia elongata*, natural size.
 Fig. 2^a. *Aglaophenia elongata*, portion of hydrothecal ramulus magnified.
 Fig. 2^b. *Aglaophenia elongata*, corbula magnified.
 Fig. 3. *Halicornaria ramulifera*, natural size.
 Fig. 3^a. *Halicornaria ramulifera*, a portion magnified.
 Figs. 3^b, 3^c. *Halicornaria ramulifera*, portions still further magnified.
 Fig. 3^d. *Halicornaria ramulifera*, portion of stem close to the root, magnified, showing its fascicled condition.

PLATE LXVIII.

- Fig. 1. *Cladocarpus formosus*, natural size.
 Fig. 1^a. *Cladocarpus formosus*, portion of stem, with hydrothecal and gonangial ramuli, magnified. *a, a.* gonangial ramuli.
 Fig. 1^b. *Cladocarpus formosus*, hydrotheca magnified (front view).
 Fig. 2. *Diplopteron insigne*, natural size.
 Fig. 2^a. *Diplopteron insigne*, portion magnified.
 Fig. 2^b. *Diplopteron insigne*, portion of hydrothecal ramulus (profile).
 Fig. 2^c. *Diplopteron insigne*, portion of hydrothecal ramulus (front view).